REMARKS

Reconsideration of the above-identified application in view of the remarks below is respectfully requested.

Claims 1-32 are currently before the Examiner. Claims 1, 9 and 19 are currently amended. Claims 3, 13 and 24-32 are currently cancelled.

Due to the illegibility of the IDS filed on April 05, 2005, applicant hereby resubmits the IDS with this response.

Claims 24-32 stand rejected under 35 USC § 103(a) as being unpatentable over Imai, US 5,120,355, in view of Song, US 6,010,596, in view of applicants admission of prior art use of generic starch compounds. In response, applicants have cancelled claims 24-32. Reconsideration of this rejection is respectfully requested.

Claims 1-18 and 20-32 stand rejected under 35 USC § 103(a) as being unpatentable over Imai, US 5,120,355, in view of Song, US 6,010,596, in view of Luongo, US 6,251,979. The rejection is respectfully traversed.

Initially, applicants have cancelled claims 3 and 13, and incorporated the subject matter into the amended independent claims to further define that the alkyl phenol used is a $C_{24}-C_{34}$ methylene coupled alkyl phenol.

Applicants present invention, for lignocellulosic composite products, comprise a wax, an alkyl phenol, at least one surfactant, a polynaphthalenesulfonic acid, an alkali metal hydroxide, water and a starch to produce an emulsion with superior performance as a water absorption control additive with a high level of stability both at high and low temperatures and an unchanging and predictable viscosity.

Imai does not teach the use of a C_{24} - C_{34} methylene coupled alkyl phenol. Imai teaches a hydrocarbon resin which may or may not contain phenol, wherein the only phenols taught or suggested are phenol, catechol, resorcinol and hydroquinone (Column 3, lines 54-63).

The present invention uses the C_{24} - C_{34} methylene coupled alkyl phenol with the polynahphalenesulfonic acid to modify the wax crystals of the wax and to allow the wax crystals to resist plating and linking with themselves. The incorporation of the C_{24} - C_{34} methylene coupled alkyl phenol allows the crystals to remain in a disassociated state until they are transferred. The wax crystals are then able to align and coat the lignocellulosic composite product, providing a beneficial water resistant property.

Song does not resolve the deficiencies of Imai. Song does not teach the applicability of an aqueous wax emulsion solely for use with a lignocellulosic composite product. Song is directed to an improved water resistant gypsum board made by adding an aqueous wax emulsion containing a cationic surfactant to an aqueous slurry containing calcium sulfate combined with a substance having higher strength, such as a wood fiber.

One skilled in the art would not look at additives that relate to gypsum products if the problem that they were attempting to solve was for lignocellulosic composite products. Lignocellulosic composites are in the natural organic substrate industry which is a different industry than the inorganic calcium sulfate industry of gypsum. There are many differences between calcium sulfate and lignocellulosic composites such as the differences in substrate size and different processes of manufacture.

Luongo does not resolve the deficiencies of Imai in view of Song as discussed above. Luongo teaches a wallboard composition comprising a combination of synthetic binders with an expanded mineral (e.g. Perlite) that reduces the amount of gypsum used. Imai's overall result is described as a "complete crosslinking between the starch, borate, and synthetic adhesive to form a strengthened web for gripping the Perlite..." (column 12, lines 35-41). The combination of

Imai, in view of the teachings of Luongo, would at best suggest lightening a gypsum board, by reducing the amount of gypsum used.

Applicants' use of a complexing starch distinguishes itself from Luongo. Generic starch in the prior art was unpredictable due to the uncontrollable viscosity that resulted from the storage conditions and additive chemistry. Applicants' emulsion produces unexpected beneficial results by crosslinking the wood fibers together, these benefits include superior performance as a water absorption control additive with a high level of stability both at high and low temperatures and an unchanging and predictable viscosity.

In previous systems without a complexed starch, adding wax to wood chips would cause non-uniform packets of wax to form on the wood chips. These packets of wax would be unpredictable, and therefore it was likely that one board would have 10% water resistance while another board would have 50% water resistance.

In the present invention, the complexed starch causes an increase in the water resistance of the lignocellulosic particles by crosslinking the wood fibers together, therefore increasing the level of linear migration of the wax. The crosslinked wood fibers provide a stable base for the uniform and predictable distribution of wax over the lignocellulosic particles, therefore increasing the level of linear migration of the wax. This is important so that the wood chips would not stick together in the manufacturing process of creating the lignocellulosic panels. If the wood chips are not properly lubricated, they will "stick and clump" together, and accordingly cause a backup in the manufacturing machine. Reconsideration of this rejection is respectfully requested.

Claims 1-32 are provisionally rejected on the ground of nonstatutory obvious-type double patenting over claims 1-23 of copending application no 10/525,917 in view of Song. The rejection is respectfully traversed.

Copending application no. 10/525,917 is not anticipated by or a mere obvious variation of the present invention and accordingly should not be provisionally rejected on the ground of nonstatutory obvious-type double patenting. Copending application no. 10/525,917 is used to provide water resistance solely for gypsum products. Gypsum products are in the inorganic calcium sulfate industry which is different from the natural organic substrate industry of lignocellulosic composites. There are many differences between calcium sulfate and lignocellulosic composites such as the differences in substrate size and different processes of manufacture.

The differences in which the present invention utilizes its starch and wax to obtain water resistance versus copending application no. 10/525,917 are great enough so that they are patently distinct. The present invention obtains its water resistance of the lignocellulosic composite by providing a uniform and predictable distribution of wax over the lignocellulosic particles while copending application no. 10/525,917 obtains its water resistance by complexing the impurities of the gypsum.

In the present invention, the complexed starch improves water resistance by providing a uniform wax distribution over the wood fibers of the lignocellulosic composite. The complexed starch crosslinks wood fibers together increasing the linear migration of the wax. When the linear migration of the wax is increased, wax is able to be impregnanted into the woodchips providing a uniform and predictable distribution of wax over the lignocellulosic particles. This uniform distribution of wax over the crosslinked wood fibers causes an increase in water resistance of the lignocellulosic composites.

In copending application no. 10/525,917, the complexed starch causes an increase in the water resistance of the gypsum board by complexing the impurities of the gypsum. This is unique from previous uses of starch in gypsum, because previously starch was only used as a bonding agent on the outer surface of the gypsum to attach the paper to. Reconsideration of this rejection is respectfully requested.

Claims 1-32 are provisionally rejected on the ground of nonstatutory obvious-type double patenting over claims 1-27 of copending application no 10/528,471 in view of Song. The rejection is respectfully traversed.

Copending application no. 10/528,471 is not anticipated by or a mere obvious variation of the present invention and accordingly should not be provisionally rejected on the ground of nonstatutory obvious-type double patenting. Copending application no. 10/528,471 is for gypsum wood fibers that differ from conventional gypsum wallboard products in that it contains from about 5 to 50 parts of wood fiber with gypsum. Gypsum products are in the inorganic calcium sulfate industry which is different from the natural organic substrate industry of lignocellulosic composites. There are many differences between calcium sulfate and lignocellulosic composites such as the differences in substrate size and different processes of manufacture.

The differences in which the present invention uses its starch and wax to obtain water resistance versus copending application no. 10/528,471 are great enough so that they are patently distinct. The present invention uses complexed starch and wax solely for lignocellulosic particles while copending application no. 10/528,471 uses complexed starch and wax for lignocellulosic particles and wood fibers.

The present invention uses a complexed starch to increase in the water resistance of the lignocellulosic particles by crosslinking the wood fibers together, therefore increasing the level of linear migration of the wax. The crosslinked wood fibers provide a stable base for a uniform and predictable distribution of wax over the lignocellulosic particles, therefore increasing the level of linear migration of the wax.

Copending application no. 10/528,471 uses a complexed starch to both complex the impurities in the gypsum and at the same time crosslink the wood fibers together to obtain water resistant properties. Additionally, copending application no. 10/528,471 uses the wax to align

and coat the gypsum wood fibers to provide additional water resistant properties. Reconsideration of this rejection is respectfully requested.

Claims 24-32 are provisionally rejected on the ground of nonstatutory obvious-type double patenting over claims 1-40 of copending application no 10/541,804 in view of applicants' admission of prior art use of generic starch in water-resistant wax emulsions. The rejection is respectfully traversed.

Copending application no. 10/541,804 is not anticipated by or a mere obvious variation of the present invention and accordingly should not be provisionally rejected on the ground of nonstatutory obvious-type double patenting. Copending application no. 10/541,804 is used solely for pressure treated lignocellulosic composites.

The differences in which the present invention utilizes its starch, wax and biocides versus copending application no. 10/541,804 are great enough so that they are patently distinct. The present invention does not require the need of biocides while copending application no. 10/541,804 uses complexed starch and wax as both an incorporator and a carrier of organic biocide.

In the present invention, the complexed starch causes an increase in the water resistance of the lignocellulosic particles by crosslinking the wood fibers together. The crosslinked wood fibers provide a stable base for the uniform and predictable distribution of wax over the lignocellulosic particles, therefore increasing the level of linear migration of the wax. This is important so that the wood chips would not stick together in the manufacturing process of creating the lignocellulosic panels. If the wood chips are not properly lubricated, they will "stick and clump" together, and accordingly cause a backup in the machine.

Copending application no. 10/541,804 uses organic biocides in the pressure treating of wood. Currently US legislation is eliminating the use of chemicals such as chromated copper arsenate, copper quat, ammonial copper zinc arsenate, copper bis(dimethyldithiocarbamate),

ammoniacal copper citrate and copper azole. In place of these chemicals organic biocides are currently being used as preservatives in wood. However these chemicals can leak out of the wood if the wood does not have strong water resistant properties.

The emulsion of copending application no. 10/541,804 therefore uses the complexed starch and wax as both an incorporator and a carrier of the organic biocide, also as a water proofing medium as it is driven into the wood structure under pressure resulting in a water resistant surface with the inherent protection from weather and insect degradation. As the wax flows through the lignocellulosic composites depositing the organic biocide the holes in the lignocellulosic material are sealed up preventing organic biocide from leaching out and providing water resistant properties. Reconsideration of this rejection is respectfully requested.

Applicants do not believe that any additional fees are due in the submission of this response. However, if any fees are due, Applicants hereby grant the USPTO to withdraw any fees as required from deposit account number 50-1863.

In light of the above amendments and remarks, it is respectfully submitted that the pending claims of the present application are in condition for allowance. If the Examiner has any questions or requires additional information, he is invited to contact the undersigned.

Respectfully submitted,

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